



# SIMULATION- BASED MEDICAL EDUCATION (SBME) IN HOMOEOPATHY

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## ABSTRACT

Simulation based medical education is an innovative teaching and learning methodology. Simulation is a generic term that refers to an artificial representation of a real-world process to achieve educational goals through experiential learning. Simulation based medical education is defined as any educational activity that utilizes simulation aides to replicate clinical scenarios. It enhances knowledge, skill, and behavioral aspects of the students to a large extent. Training in SBME is provided mainly with the aid of simulators, ranging from low to high fidelity and the training can be given to students in a risk-free environment.

Curriculum of Homoeopathic medical graduation course insists to teach all the aspects of basic medical science along with specific Homoeopathic subjects. SBME is not a replacement to other teaching methodologies, instead it acts as an additional aid. National commission for Homoeopathy has taken a new inscription to include skill lab training as a part of undergraduate curriculum in their recently released syllabus draft. Enhancement of Proficiency among the scholars can be assured through acquisition of both knowledge and clinical skills. Difficulty in application of theoretical knowledge to management of patients is the main problem faced by undergraduates. In this context it is worth to build up clinical competency by providing experiential learning in a controlled safe environment through simulation based medical education. It will make the clinical training more standardized and to achieve this goal, all the faculties need to be trained and equipped with all levels of simulation technologies in medical education.

**KEY WORDS:** Simulation, medical education, experiential learning, Homoeopathy, clinical scenario, virtual reality.

## INTRODUCTION:

The entire world is disrupted by the emergence of the pandemic - covid 19 and its negative impact is creating problems in every aspect of human life. The medical education system is the one which is badly hit by the emergence of Covid-19, as it failed to a great extent in imparting patient-oriented training to medical graduates and post graduates. The present scenario compelled us to rethink about the conventional methodologies of teaching and learning and consequently educational systems are transformed from a state of institutional education to digital platform. Medical education is also shifted towards experiential ('hands-on') medical learning; however, applying this concept to real patients is less acceptable to society and is subject to legal and ethical issues. Currently we have immense sources to acquire theoretical knowledge about everything within seconds through worldwide connectivity, so also in health-related issues. Simulation based medical education is a part of such technology, which is emerging as an innovative teaching and evaluation methodology. It is recommended that the technology-enhanced simulation training in health professional education improves knowledge, skill, and behavioral aspects to a large extent and moderate effects for patient-related outcomes. (1) This article is describing the fundamentals of the above said teaching methodology, and the aim is to make all the health science faculty aware of the concept of simulation-based teaching and learning to impart effective training in Homoeopathic medical education.

## DISCUSSION:

Experiential learning is the key element of Simulation to achieve educational goals using simulators. There are different types of simulators according to the degree of their resemblance to the reality, or 'fidelity', from low fidelity to high fidelity simulators (2). This research proven method provides hands on training and the student or trainee required to respond to the problems as she or he would under natural circumstances.

This Complementary teaching method in medical education is not meant for replacing traditional methods of teaching, but to add to". Advanced SBME can provide realistic representations of complex clinical environments and allow educators to alter patient reactions and responses in ways unattainable with actual patients. (3)

Curriculum of Homoeopathic graduation course insist to teach all the aspects of basic medical science and specific Homoeopathic subjects and majority of the teaching faculties are following conventional teaching aids for teaching and learning. Simulation methodologies are not gained overhype in Homoeopathic medical education as it is not made mandatory by the central council for Homoeopathy. Even then some of the Homoeopathic medical colleges are running skill labs effectively. Enhancement of Proficiency among the scholars can be assured through acquisition of both theoretical knowledge and clinical skills. Difficulty in application of theoretical knowledge to management of patients is the main problem faced by undergraduates (2). In this context it is worth to build up clinical competency by providing experiential learning in a controlled safe

environment through simulation based medical education. (4)

Experiential learning is an active process during which the learner constructs knowledge by linking new information and new experiences with previous knowledge and understanding (5). Development of clinical competency leads the list of advantages of medical simulation. Thereby improves patient safety and reduce health care costs through the improvement of the medical provider's competencies. Clinical competency refines the ability of communication skill, history taking, professional attitude, awareness of ethical basis of health care, physical examination, therapeutic skill, resuscitation skill, clinical laboratory skills, diagnostic skills, critical thinking, clinical reasoning, problem solving, team work, organizational skill, and management skills (5). These are the areas to be given prime importance in Homoeopathic medical education too. The faculties are to be well equipped for offering such an effective training for the budding Homoeopaths for ensuring patient safety.

It promotes faculty improvement and team-based learning (6) and can be used for evaluation and assessment of students more accurately. (5) Interprofessional approaches to learning and health care can be promoted through this emerging methodology. (7).

The present scenario of medical education with real patient-oriented training is creating bias in providing equal chances for learning to every students especially in case of rare diseases and in unexpected emergencies. (7)

Teaching and learning through Clinical scenarios, use of simulation manikins, training with standardized/simulated patients and virtual simulators are now in use under SBME. All these modalities may be incorporated in Homoeopathic medical education for enhancing clinical competency especially in individualizing the patient through case taking, developing skills in investigations and diagnosis and management of the case. We can design clinical scenarios or set simulated patients to teach different approaches of Homoeopathic interventions in management of cases according to different types of disease. Eliciting characteristic symptoms, case analysis and evaluation and totality construction are the other areas where students find difficulty in practice. Repeated training through clinical scenarios offer proficiency in these aspects.

Virtual reality systems are emerging technologies that have drawn scientists' attention to its potential benefit for rehabilitation. (8)

## Terminologies in simulation:

### Clinical scenario:

After setting the learning objectives, a situation is created which is the replica of the real one, mostly carried out by a team in a simulated environment. It can be videotaped for immediate feedback to participants during debriefing sessions. Debriefing initiates discussions and make sure that all the learning objectives were covered. (2)

**Debriefing:**

Can focus both around the cognitive process involved in the recognition of the problem, the implementation of the management guidelines and the technical level at which the ability of the learner to apply rules and appropriate responses in a stressful situation is evaluated. (2)

**Simulators:**

*High fidelity simulators* – can respond, blink, eye movement eg: METI human patient simulator, Noelle (obstetric simulator)

*Medium fidelity simulator* – Harvey (cardiology simulator) can hear sound, pulse, breathing sound

*Low fidelity simulator* – it is static to teach basics of technical skills, eg: IV trainer

*Virtual reality* – advanced human computer interaction used in the case of haptic feedback to produce feeling of resistance when using instruments in simulation environment.

Eg: endoscopic, laparoscopic trainers

**Simulated and standardized patients (2):**

They are usually, but not necessarily, lay people who are trained to portray a patient with a specific condition in a realistic way, sometimes in a standardized way (where they give a consistent presentation which does not vary from student to student). SPs can be used for teaching and assessment of consultation and clinical/physical examination skills, in simulated teaching environments or in situ. (9)

**Virtual Reality (VR):**

VR is the use of software to create an immersive (feeling of being there) simulated environment. Virtual reality is best described as a concept of advanced human-computer interaction (2). They are commercially available, so are simple to setup, and designed for ease and safety of use. Many VR systems work with no faculty required. Learners can go to the VR system and take part in simulation whenever they like (9)

Eg: Tools for General Anatomy

YOU is a real-time simulation of the human body which explore organs and systems in a fully immersive 3D environment in virtual reality, display diseases in varying states of severity, and add treatments to visualize and understand medical options. (10)

It allows studying any structure of the human body by placing the user inside each one. By allowing virtual immersion in a body structure such as the interior of the cranium, stereoscopic vision goggles make these innovative teaching technologies a powerful tool for training in all areas of health sciences (11)

September 17<sup>th</sup> is observed as world patient safety day. It is reported that Globally, as many as 4 in 10 patients are harmed in primary and outpatient health care. Up to 80% of harm is preventable. The most detrimental errors are related to diagnosis, prescription and the use of medicines (12)

**CONCLUSION:**

It is a best standard for education and evaluation. It touches all three domains namely cognition, motor skills and attitude of the students. Clinical competency has been found to be enhanced through medical simulation at the undergraduate and postgraduate levels. Experiential learning through simulation can play a very significant role, not only in hospital settings but also in community contexts helpful in community education in disease prevention, safe health practices, nutrition and wellness through setting up simulated rural community village.

Teaching should not be simply based on imparting theoretical knowledge and assessment, but should be practical oriented. SBME can be considered as an addition to conventional method of teaching. Simulated/ standardized patients, clinical scenarios and role play, virtual simulators etc. Can be effectively utilized to develop skill in the area of perception, systematic case analysis and evaluation, totality construction and individualization in Homoeopathic training. Procedural skills like intra venous infusion, catheterization, IM injections, suturing techniques etc can be given to enhance the skills. All the faculties must be sensitized in this regard through workshops as an initial step.

In general Quality and quantity of research in this area is limited and need more research to confirm the effectiveness (7)

**Example For A Simulation Scenario Of Cardiopulmonary Resuscitation In Adults:**

Conducted at Govt. Homoeopathic Medical College, Kozhikode among a group of 10 post graduate students.

**Target:** Post graduate students, Govt: Homoeopathic Medical College, Kozhikode

**Introduction:**

Cardiopulmonary resuscitation is a life saving intervention, if it is done in an effective way. Rate of patient's survival depends on rate and quality of chest compression and ventilation. So it is our duty as healthcare providers to make our students competent to provide effective CPR in emergency. This aim may not be achieved through passive lecturing alone. Now medical simulation has emerged as a teaching and assessment method which allows the learner to practice patient care away from bedside in a controlled and safe environment. To ensure skill at an expert level the deliberate practice of hands-on training is necessary. So we made an attempt to teach CPR to post graduate students of Govt. Homoeopathic Medical College, Kozhikode with the help of a hybrid simulation modality involving CPR manikin and role play.

**Background:** The study was planned to make the student competent in performing effective CPR with the help of hybrid simulation modality and aimed to evaluate the impact of this session through pre and post test

The study population was a group of 10 post graduate students from different discipline.

**Venue:** The simulation scenario was conducted at the simulation lab of Govt. Homoeopathic Medical College, Kozhikode  
Over view

**Title:** Simulation scenario of cardiopulmonary resuscitation in adults

**Author:** Dr. Smitha Madhavan

**Purpose:** To teach the students about the effective way of giving CPR

**Date:** 5.9.2019

**Time schedule:**

Set up	: 20 mts
Run simulation	: 30 mts
Debriefing	: 10 mts
Total	: 1 hr

**Target learners:** Post graduate students

**Learning objectives:**

At the end of the session the students should be able to:

1. To learn the algorithm of doing CPR
2. To give effective chest compression and ventilation

**Clinical context:**

Anil, aged 52 years, fell down unconsciously on the road while jogging with his wife. He was hypertensive. Assume that the person was unresponsive. No pulse and respiration on examination.

**Knowledge, skill, attitude:**

**Knowledge:** Followed correct sequence of the algorithm of doing CPR

**Skill:** Gave effective chest compression which was verified by hearing a click sound while doing it on the manikin and provided effective rescue breathing noted by chest rise in the manikin.

**Event / trigger:**

Wife was asking distracting questions.

**Patient profile:**

**Name:** Anil

**Age:** 52 years

**Gender:** Male

**Vital signs:** No respiration and carotid pulse

**Current medication:** Taking antihypertensive medicine

**Modality:** Hybrid (CPR manikin and role play)

**Scenario cast members:** 2 learners, one instructor, and one patient

**Confederate:** patient's wife, crowd

**Equipment preparation:** CPR manikin, sheet for support of knee

**Debriefing:** 10 minutes debriefing was done after the scenario. During this session the students could be able to point out their mistakes (scene safety was not checked) and the entire participants opinioned that, simulation provides better and effective learning experience. The candidate who acted in the student role was so happy to express her satisfactory feeling, as she did a great job to save the life of a person. All the participants demanded to learn other procedural skills through this way.

**Pre test and post test:**

Pre test and post test were conducted before and after the simulation scenario respectively, to evaluate the theoretical knowledge of the participants by using the same questionnaire. The questionnaire consists of ten multiple choice questions based on the different aspects of CPR.

**Analysis of pre and post test:****Master chart:****Table showing Pre test results**

Sl. no	Name of candidate	Marks scored
1	A	7
2	B	6
3	C	5
4	D	7
5	E	5
6	F	4
7	G	6
8	H	2
9	I	5
10	J	2

Average score secured by participants in pretest= 4.9

**Table showing Post test results**

Sl. no	Name of candidate	Marks scored
1	A	10
2	B	10
3	C	9
4	D	9
5	E	9
6	F	9
7	G	9
8	H	10
9	I	10
10	J	10

Average score secured by candidates in post test in post test= 9.5

**ANALYSIS OF RESULTS:**

The average marks scored in the pre-test by the 10 candidates were 4.9 marks out of a maximum 10 marks. In the post-test, the average marks scored by the candidates were 9.5 out of a maximum 10 marks.

In the pre-test analysis, a total of 2 students secured 2 marks, 1 student scored 4 marks, 3 students scored 5 marks, 2 students scored 6 marks, and 2 students scored 7 marks.

In the post test analysis, 5 students scored 9 marks, and 5 students scored 10 marks. The analysis showed significant improvement in the mean score of the participants after the simulation scenario.

**Comparison between pre and post test**

No	Question	Pre – test		Post – test	
		No. of candidates got correct answer	%	No. of candidate got correct answer	%
1	What is 'CAB' of CPR	5	50	10	100
2	Depth of chest compression in adults while doing CPR	1	10	10	100
3	Which pulse are we suppose to check in adults during CPR?	9	90	10	100
4	Compression to ventilation ratio in adult CPR	8	80	10	100
5	Rate of chest compression in CPR	4	40	9	90
6	How long would you assess the carotid pulse ?	5	50	10	100
7	Which is the initial step to begin CPR	5	50	10	100
8	How many cycles of CPR should be given in 2 minutes	2	20	6	60
9	What is AED	9	90	10	100
10	Recovery position	1	10	10	100

The first question was about the 'CAB' of CPR. In the pre-test 5 out of 10 students (50%) got it correct. In the post-test 10 out of 10 (100 %) gave the correct response.

The second question was about Depth of chest compression in adults while doing CPR. In the pre-test only 1 out of 10 (10 %) gave the correct answer. In the post – test analysis, 10 out of 10 (100%) got it correct.

The third question was regarding the pulse which we suppose to check in adults during CPR. In the pre-test analysis, 9 out of 10 (90 %) were able to give the correct response. 10 out of 10 (100%) gave correct response in post – test

The fourth question was about the Compression to ventilation ratio in adult CPR. In the pre-test analysis, 8 out of 10 (80 %) gave the correct response. 10 out of 10 (100%) gave the right answer in post-test

The fifth question was about Rate of chest compression in CPR. In the pre-test, 4 out of 10 (40%) gave the correct answer. In the post – test, 90 % got it correct.

The sixth question was about the duration of assessment of the carotid pulse? Only 5 out of 10 candidates (50 %) got it right in the pre-test and all the participants (100%) got it right in the post – test

The seventh question was about the initial step to begin CPR. Out of 10, 5 candidates (50 %) gave correct response in pre – test. During post – test 10 out of 10 (100 %) got it right.

The eight question was about the number of cycles of CPR should be given in 2 minutes. 2 out of 10 (20 %) gave correct response in the pre-test. During post – test, 6 out of 10 (60 %) gave correct answer.

The ninth question was about the full form of AED. 9 out of 10 (100 %) gave correct response in pre- test. In the post – test, 10 out of 10 (100 %) got it right in the post – test.

The tenth question was about the recovery position. Only one candidate gave correct answer in the pre test and in the post test all the candidates got it correct.

This confirmed that each individual item in the pretest secured an improved score in the post test.

**RESULTS AND DISCUSSION:**

Significant improvement was noted in the average score secured by the candidates in the post test, when compared to pre test. This showed that the domain of knowledge can be enhanced through simulation based learning. Competency can be ensured in doing effective chest compression and mouth ventilation. Student's feeling of being valued among the society and their feeling of self-esteem can generate a spark of motivation.

This study is intended to give training in cardiopulmonary resuscitation as, the students from Homoeopathic medical institutions are usually getting less exposure to emergency situations.

Apart from teaching the procedural skills and basic medical sciences to the students, simulation based medical education especially simulated/ standardized patients and role play, can be effectively utilized to develop skill in the vital areas of Homoeopathy such as the area of case taking, systematic case analysis and individualization.

These types of interactive sessions are more effective than regular text-book oriented education

All the 10 students in the learners group were provided hands on training with the CPR manikin after demonstration. Then simulation scenario was conducted. Assessment was done with the check list shown below .

**CHECK LIST:**

Sequential order	Procedure	Done correctly	Not done	Remarks
1	Scene safety			
2	Check for responsiveness			
3	Call for help and to get an AED			
4	Circulation			
5	Airway			
6	Breathing			

**REFERENCES:**

- I. David.A.Cook. Technology-enhanced simulation for health professions education: a systematic review and meta-analysis. PMID: 21900138 DOI: 2011 Sep 7;306(9):978-8810.1001/jama.2011.1234 (pubmed)
- II. Simulation based team training in health care WalterEppic et al. SimulHealthc.2011

Aug Doi: 10.1097/SIH.06013e318229f550Pubmed.ncbi.nlm.nih.gov

- III. Abdulmohsen H. Al-Elq. Simulation based medical teaching and learning. PMID:22022669 J Family community medicine 2010 Jan-Apr; 17(1): 35–40 doi: 10.4103/1319-1683.68787 (PMC)
- IV. Paul Bradleg. Med Educ. 2006 Mar; Med Educ. 2006 March 40(3): 254–62 The history of simulation in medical education and possible future directions Doi:10.1111/j.1365-2929.2006.02394X PMID: 16483328
- V. Simulation based team training in health care Walter Eppic et al. Simul Healthc. 2011 Aug; Doi:10.1097/SIH.06013e318229f550Pubmed.ncbi.nlm.nih.gov
- VI. Sylvain Boet et al. Med Teach. 2014 Oct; Twelve tips for a successful inter professional team based high fidelity simulation education session (Pubmed)
- VII. Burhanuddin Ali Akber, Simulated learning in rural community environment: pushing the boundary Adv Simul 6, 5 (2021). <https://doi.org/10.1186/s41077-021-00155-3> (Open access)
- VIII. Santiago González Izard Virtual Reality Educational Tool for Human Anatomy PMID: 28326490 DOI: 10.1007/s10916-017-0723-6 (pubmed) J Med Syst. 2017 May; 41(5):76.
- IX. Jack Pottle Virtual reality and the transformation of medical education Future Healthc J. 2019 Oct; 6(3):181–185. doi: 10.7861/fhj.2019-0036, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6798020/>
- X. Rashmi Datta Simulation and its role in medical education, Med J Armed Forces India 2012 Apr; 68(2):167–72. doi: 10.1016/S0377-1237(12)60040-9. Epub 2012 Apr 21, PMID: 24623932 PMCID: PMC3862660 DOI: 10.1016/S0377-1237(12)60040-9
- XI. <https://www.who.int/news-room/fact-sheets/detail/patient-safety> Patient Safety
- XII. Jennifer A Cleland The use of simulated patients in medical education <https://pubmed.ncbi.nlm.nih.gov/19811162/> Med Teach. 2009 Jun; 31(6):477–86. PMID: 19811162 DOI: 10.1080/01421590903002821